

# PATENT SPECIFICATION

Convention Date (Germany) : Oct. 29, 1934.

449,384

Application Date (In United Kingdom) : Oct. 22, 1935. No. 29150/35.

Complete Specification Accepted: June 25, 1936.



## COMPLETE SPECIFICATION

### Process for the Direct Manufacture of Pipes and Slabs of Cement

I, ALESSANDRO MAGNANI, an Italian Subject, of Broni, Pavia, Italy, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

A method has already been proposed in Specification No. 361,598 for forming socketed tubes from fibrous cement material by moulding on a permeable rotary matrix roller by means of a shaping roller rotating in contact therewith. According to this method the cement mortar is supplied directly to the space between the two rollers in a manner which can be regulated according to the thickness and the diameter which is to be given to each part of the periphery of the tube. This method results in products of good quality and presents no difficulties, even at the parts where the main portion of the tube is joined to the socket, due to the fact that the quantity of cement mortar which is supplied for rolling between the matrix roller and the shaping roller can be suitably regulated.

Another simpler method has been proposed in specification No. 407,612 which is suitable for manufacturing continuously pipes which are of somewhat inferior quality, but are not so expensive to make. With this method, it is no longer necessary to prepare the cement mortar separately and the need for a pump the delivery of which can be regulated is removed. In accordance with this method the cement mortar is formed first at the moment when it is used, powdered cement being supplied to a moulding drum the surface of which is damp and transferred therefrom as a film to form a succession of thin layers on a porous cylindrical shell subjected to internal suction. This gives adequate and regular distribution of the cement but the kneading of the cement is not always as perfect as required.

The present invention relates to a method which may be said to constitute a compromise between the two methods referred to above, owing to the fact that

a cement mortar previously prepared as in Specification No. 361,598, but more fluid, is picked up by a collecting and moulding drum from a receptacle, or is deposited upon the said drum in a longitudinal zone sufficiently removed from the moulding zone. The tubes are formed by transfer of the cement to a second drum, which is hereafter referred to as the wrapping drum and which rotates in contact with the collecting drum.

Difficulties might arise in the transfer of the cement mortar from one drum to the other and in the formation of the conical portion joining the body of the tube with the socket. Since deposition of the cement cannot be regulated, rents might be produced in the conical portion which would result in a great deal of waste. These difficulties are removed by providing the drums with permeable surfaces so as to permit the use of very fluid cement mortars and by separating the moulding drum into two parts in a plane passing through a point intermediate the ends of the conical portion.

Moreover in order to obtain high grade products it is necessary to make use of mortars in which the mixture of cement and fibrous material is very intimate and very uniform. In order to attain this result it has been necessary to make these mortars very dilute and consequently they contained surplus water. This great excess of water cannot easily be removed when the layers of cement mortar have become stratified on the wrapping drum, even although the latter be permeable, as in the prior specifications. It is therefore necessary that the moulding drum should also be permeable in known manner, so that, as it forms each fresh layer, it picks up and removes a large quantity of water which could not filter through the layers previously disposed on the wrapping drum so as to pass through the permeable wall of the latter.

When it is necessary to produce tubes or plates having a high degree of homogeneity and consequently great mechanical strength, it is necessary to

[Price 1/-]

have recourse to the method according to the present invention and not to those according to the prior specifications referred to above. A further advantage that is obtained with the present invention is a simplification in the necessary plant, which can be installed at remarkably small expense, as has been proved in the case of factories which have for some years made use of the inventions described in the prior specifications referred to and have now installed plant for carrying out the method according to the present invention.

15 Apparatus suitable for carrying out the method according to the present invention is illustrated diagrammatically and by way of example in the accompanying drawings in which:

20 Fig. 1 is a transverse section and Fig. 2 is a plan view of the apparatus.

Referring to Fig. 1, a drum 1 is mounted for rotation on a shaft 2 so as to dip into the fluid cement mortar 3 contained in a receptacle 4. A second drum 5 is mounted on a shaft 6, so as to make tangential contact with the drum 1. The drum 5 is driven through the shaft 6 from any suitable power source (not indicated in the drawings) and drives the drum 1 by friction. As the drum 1 rotates, it picks up from the vat or tank a layer 7 of cement mortar which is transferred to the drum 5 at 8. In order to ensure that the cement mortar is picked up by the drum 1 and transferred to the drum 5 in an even and reliable manner, the surfaces of both drums are made of permeable material and a reduced pressure is created inside each of the drums by any suitable known means.

The layer 7<sup>a</sup> collected on the wrapping drum 5 may gradually acquire considerable thickness, provided that the shaft 6 is suitably mounted for movement in a direction normal to the tangential plane between the two drums, for example in a guide 12 and against the action of a suitable spring 9.

The layer 7<sup>a</sup> may eventually be removed in the form of a pipe; or it may be cut longitudinally, opened out and used as a slab.

25 The method according to the present invention also permits of the production of pipes provided with socket connections. The apparatus will then have the form shown in Fig. 2, in which the collecting drum comprises two independent coaxial parts 1, 1<sup>a</sup> of different diameter, mounted on the same shaft and in contact with one another at the central plane of contact 10. The plane of contact 10 lies in the tapered portion or

shoulder uniting the two parts 1, 1<sup>a</sup> of different diameter. The wrapping drum has an enlargement 5<sup>a</sup> corresponding to the socket which is to be formed on the pipe and, between the two parts 5, 5<sup>a</sup> of the wrapping drum, there is provided a shoulder 10<sup>a</sup> corresponding to the shoulder uniting the parts 1, 1<sup>a</sup> of the collecting drum. By means of this arrangement the two parts 1, 1<sup>a</sup> of the collecting drum will be driven at different speeds and a smooth layer of cement mortar, somewhat helicoidal, but unbroken, will be formed on the shoulder 10<sup>a</sup> of the wrapping drum.

The cement mortar may, if desired, be delivered through one or more ducts 11 delivering in a longitudinal zone in advance of the moulding zone, in which case the vat or tank 4 will not be needed.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Method for the direct manufacture of tubes, slabs and the like of cement, e.g. of fibrous cement, by moulding between a collecting and moulding drum and a wrapping drum which is permeable, characterised in that a fluid cement mortar is delivered to the moulding drum in a longitudinal zone which is sufficiently removed from the moulding zone to permit the cement mortar, before reaching the said moulding zone, to spread uniformly over the whole width of the said drum, the surface of which is permeable and subject to suction from its interior.

2. Method as claimed in claim 1, characterised in that the moulding drum picks up the fluid cement mortar from a receptacle into which its lower portion dips.

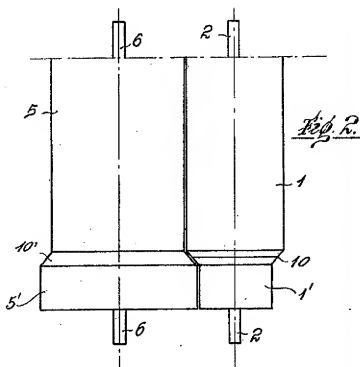
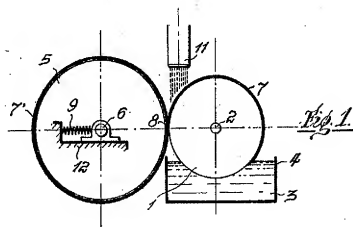
3. Method as claimed in claim 1, characterised in that the moulding drum receives the fluid cement mortar from one or more ducts which feed the said mortar along the said drum in a longitudinal zone in advance of the moulding zone.

4. Method as claimed in any one of claims 1 to 3, as applied to the manufacture of socketed pipes, characterised in that the moulding drum is divided into two relatively rotatable parts at a point between the ends of a conical portion joining the part corresponding to the main part of the tube to that corresponding to the socket.

Dated this 22nd day of October, 1895.

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[This Drawing is a full size reproduction of the Original.]